Mercury Thermometer Exchange Program

Report of Activities - 2004

Rhode Island Department of Health
Office of Environmental Health Risk Assessment
August 2005

EXECUTIVE SUMMARY

Rhode Island is a much safer place since 92 pounds of mercury from thermometers and other items (e.g., mercury switches & thermostats) were collected during the Rhode Island Department of Health's (HEALTH) second annual series of community mercury thermometer exchanges held May 22, June 5, September 8 & 9, and December 3 & 4, 2004. Approximately 440 individuals participated in this opportunity to properly dispose of over 990 mercury thermometers and 60 other items which contained a significant quantity of mercury.

These thermometer exchanges are designed to get mercury-containing products safely out of circulation before accidental or intentional contamination occurs. The quantity of mercury released from even a single broken thermometer can cause a significant degree of contamination in the home. They not only present a health risk but also pose a problem to those who want to dispose of them safely. Other potential sources of mercury exposures in homes may present an even greater public health risk. The 990 thermometers (each containing approximately 0.0273 ounces of mercury) collected during this event were only responsible for approximately 1.7 (1.8%) of the 92 pounds of mercury collected. Removing these 60 other mercury-containing items from circulation prevents a public health impact equivalent to the collection of nearly 52,930 mercury-containing thermometers.

The incentive for participants, in addition to protecting the environment, was to offer a digital thermometer in exchange for their mercury-containing thermometers. Each participant also received literature about related environmental topics, such as mercury in fish and proper disposal of home-generated medical waste. HEALTH partnered with many agencies, including a hospital and local fire companies, to make these exchange days successful.

Mercury recycling programs are the best way to prevent further environmental mercury contamination and exposures. Breathing fumes, eating contaminated fish, or contacting spilled mercury exposes people to its harmful effects. Elemental mercury also provides a ready method for intentionally contaminating unsuspecting facilities such as hospitals, schools and public buildings. There have been numerous incidents at schools and similar facilities in other states where accidental or intentional mercury contamination has caused children to be taken to area hospitals. In addition, schools had to be shut down until the facility could be decontaminated, causing a significant strain on already tight and over-extended budgets. The public health and economic impact could be even greater with an intentional release involving larger quantities of elemental mercury. Removing 92 pounds of mercury in thermometers and other items from the community and disposing of it properly is one step in limiting the potential for both accidental and intentional mercury exposure in Rhode Island.

INTRODUCTION

Although Rhode Island banned the sale of mercury-containing fever thermometers as of January 1, 2002, this legislation didn't address handling or disposal of mercury-containing thermometers already in residential use. Thermometers are one of the many potential sources of mercury exposure in a home. Accidental mercury releases from broken thermometers and thermostats in the home present a risk to families, as well as to the community. During 2004 the Poison Control Hotline for Rhode Island and Massachusetts received 481 calls about broken mercury thermometers[1].

The quantity of mercury released from even a single broken thermometer can cause a significant degree of contamination in the home. Thermometer collection programs aim to get mercury-containing products safely out of circulation before accidental or intentional contamination occurs. If not handled and disposed of properly, elemental mercury poses an extremely high risk of contamination for other unsuspecting facilities such as hospitals, schools and public buildings. There have been numerous incidents at schools and similar facilities in other states where mercury contamination has caused children to be taken to area hospitals. In addition, schools had to be shut down until the facility could be decontaminated, causing a significant strain on already tight and over-extended budgets. The public health and economic impact could be even greater with an intentional release involving larger quantities of elemental mercury. Furthermore, unless mercury is collected and sent to special recycling facilities, the mercury in thermometers and other devices will gradually contribute to environmental mercury contamination. Mercury thrown in the trash goes to either incinerators or landfills, neither of which stop mercury from escaping into the environment. Much of this mercury contamination eventually makes its way to lakes and rivers where it contaminates many kinds of fish. Breathing fumes, eating contaminated fish, or contacting spilled mercury exposes people to its harmful effects.

This report summarizes the mercury thermometer collection activities sponsored by HEALTH and its community partners during the calendar year 2004.

PLANNING AND LOGISTICS

HEALTH, in partnership with the Bristol Fire Department (482 Metacom Avenue), Hope Valley Fire Department (996 Main Street), Miriam Hospital (164 Summit Avenue, Providence), Pawtucket Fire Department (301 Smithfield Avenue), Rhode Island Department of Environmental Management (DEM), Warwick Fire Department (140 Veterans Memorial Drive) and Woonsocket Fire Department (5 Cumberland Hill Road), sponsored collection sites on May 22, June 5, September 8 & 9, and December 3 & 4, 2004. Exchange participants were asked to bring a mercury thermometer or other mercury-containing item, in its original container or sealed plastic bag, to any of the drop-off locations.

[1] Regional Center for Poison Control and Prevention, personal communication, August 2005.

Extensive planning and coordination is needed in order to make an exchange a success.

- **Volunteer Recruitment**

  The volunteers who worked at the collection sites were recruited by contacting partners participating in the exchange and coordinating personnel between sites.

- **Program Advertisement**

  HEALTH issued a press release to inform the public about this mercury thermometer exchange. Information about the mercury thermometer collection days were also placed on HEALTH's website. Additionally, the event was advertised in the newspaper, on local radio stations, and with fliers posted at a variety of businesses in several communities around the state. E-mail was an essential tool used to inform others about this event as were the signs posted at each individual site the day of the exchange.

- **Program Incentives**

  In exchange for a thermometer or other household items that contained mercury, each participant received a free digital thermometer. Participants were also provided with literature about related environmental health topics (i.e., mercury in fish, proper disposal of home-generated medical waste).

- **Program Evaluation**

  Information was gathered from each participant the day of exchange, such as what town they lived in, how they heard about the mercury thermometer exchange program, how many thermometers they were exchanging, as well as if they had other mercury-containing products to drop-off that day. Analysis of this information revealed several interesting patterns (c.f., **Results** below) and will be a valuable tool for determining future exchange locations.

RESULTS

Approximately 440 individuals participated in this opportunity to dispose of thermometers and other items which contained a significant quantity of mercury. Approximately 92 pounds of mercury was collected, including over 990 thermometers and 60 other mercury-containing items (e.g. mercury switches & thermostats). As noted above, thermometers are one of many potential sources of mercury exposure in homes. They not only present a health risk but also pose a problem to those who want to dispose of them safely. Other potential sources of mercury exposures in homes may present an even greater public health risk. To help put this fact into proper perspective, the 990 thermometers (each containing approximately 0.0273 ounces of mercury) were responsible for only 1.7 (1.8%) of the 92 pounds of mercury collected. The 60 other items accounted for over 98% of the mercury collected. Removing these other mercury-containing items from circulation prevents a public health impact equivalent to the collection of nearly 52,930 mercury-containing thermometers. Photos of some collected items are included in **Appendix B**.

Data from the 2003 series of thermometer exchanges appeared to indicate that the majority of participants would be from either the host community or no more than two towns away. This trend continued during the 2004 series of exchanges.

Figure 1 presents data for the city/town of residence for the 40 participants utilizing the Bristol drop-off site. As might be expected, slightly over 65% of the participants were from Bristol [26]. An additional 30% were from surrounding communities [Barrington (4); Warren (2); East Providence (6)]. The remainder [2] were from other cities/towns across the State.

Figure 2 presents similar data for the 44 participants utilizing the Hope Valley drop-off site. Slightly over 52% of the participants were either from Richmond [11] or Hopington [12]. An additional 30% were from surrounding communities [Westerly (5); Charlestown (2); South Kingstown (6)]. Essentially all of the other participants were from Washington County [5] or nearby Connecticut [2].

Figure 3 presents similar data for the 85 participants utilizing the Warwick drop-off site [two exchange dates]. Slightly over 68% of the participants were from Warwick [58]. An additional 28% were from surrounding communities [Cranston (10); West Warwick (4)]. The remainder were from Kent County [3] and other cities/towns [10] across the State.

Figure 4 presents similar data for the 131 participants utilizing the Pawtucket drop-off site. Slightly over 43% of the participants were from Pawtucket [56]. An additional 16% were from surrounding communities [Cumberland (10); Lincoln (14)]. The remainder were from Providence County [11], other cities/towns across the State [5] and nearby Massachusetts [1]. The typical pattern for participant city/town of residence noted for most other exchange sites may be somewhat altered by the fact that this information was not obtained from 40% [34] of the participants at this site.

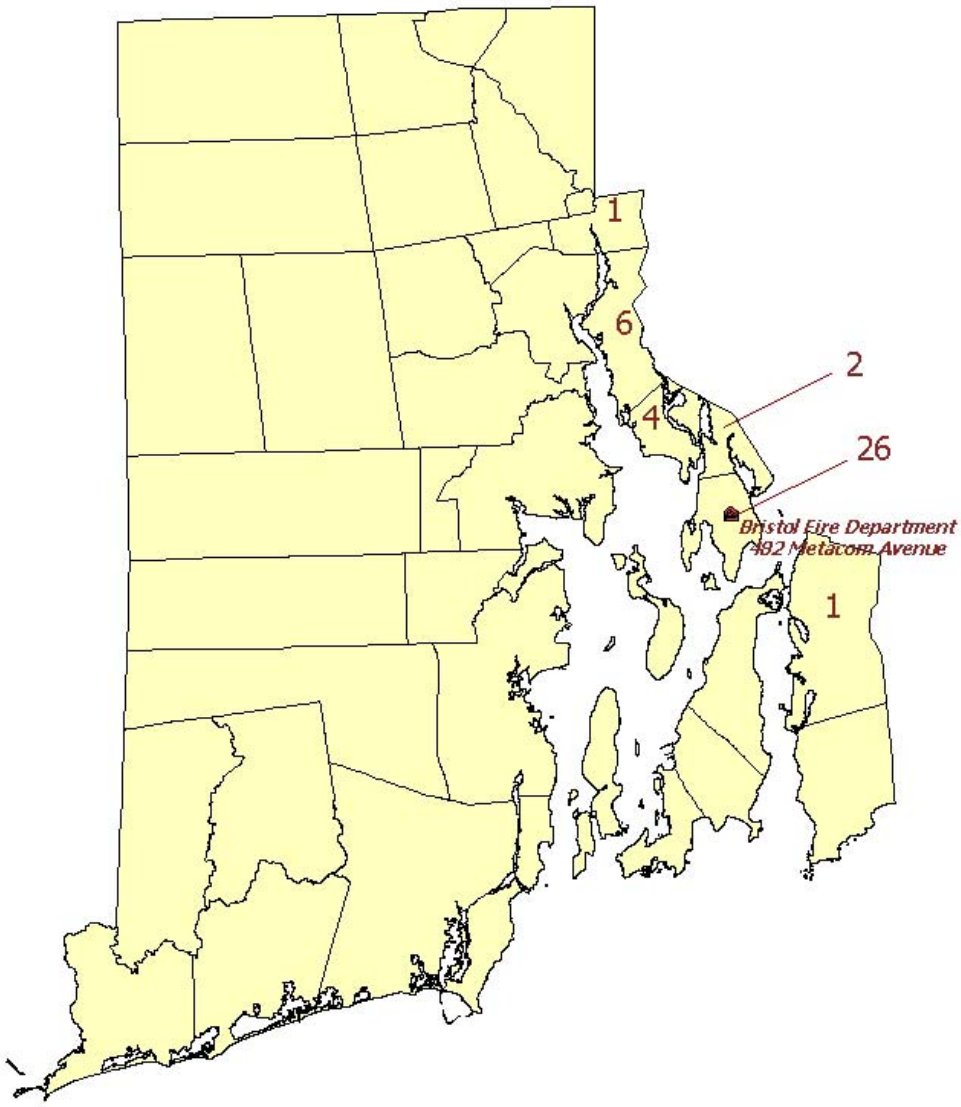
Figure 5 presents similar data for the 83 participants utilizing the Woonsocket drop-off site. Slightly over 72% of the participants were from Woonsocket [60]. All of the remaining participants were from towns [Cumberland (14); North Smithfield (6); Blackstone, MA (2); Lincoln (1)] that directly abut Woonsocket.

Table 1 summarizes city/town of residence data for all 383 community-based program participants in this second annual series of thermometer exchanges.

Table 2 summarizes data on the number of mercury-containing items dropped-off by each community-based program participant. Approximately 45% of the participants dropped off only a single thermometer [20% of total collected]. Another 43% of the participants handed-in between 2-5 thermometers [52% of total collected]. The remaining 12% of the participants [6-29 thermometers each] accounted for 28% of the total collected.

In addition to the community-based exchange programs detailed in Figures 1-5 and Tables 1 & 2, HEALTH also partnered with Miriam Hospital in Providence to conduct a thermometer exchange program (limited to their employees and staff) on 8 & 9 September 2004. This hospital-based exchange program involved 56 persons and collected a total of 13 pounds of mercury, including 119 thermometers, three oversize lab thermometers, six thermostats, one blood pressure unit, ten pounds of elemental mercury, one vial of liquid mercury (quantity unspecified) and one pen with a mercury clip.

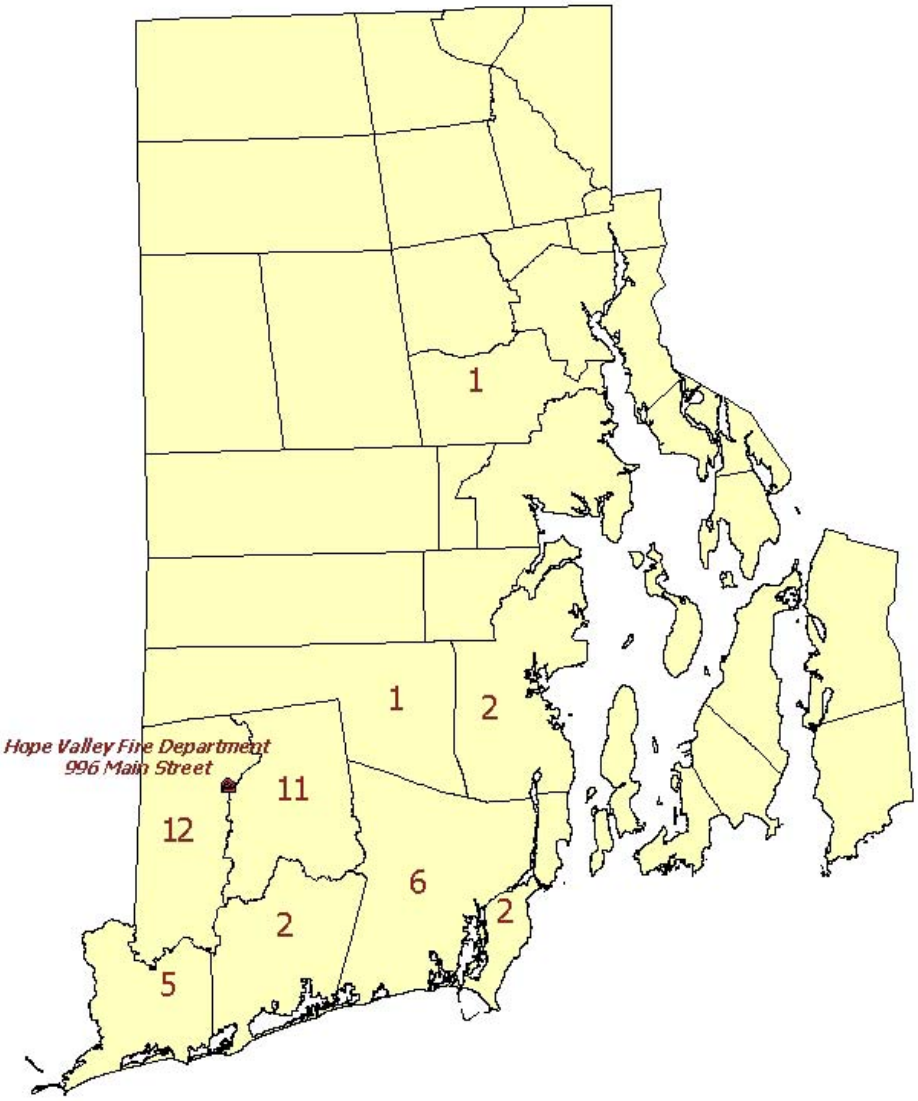
PARTICIPANT CITY/TOWN
MERCIRY THERMOMETER EXCHANGE
22 MAY 2004



OUT OF STATE/UNKNOWN = 0
TOTAL PARTICIPANTS = 40

FIGURE 1

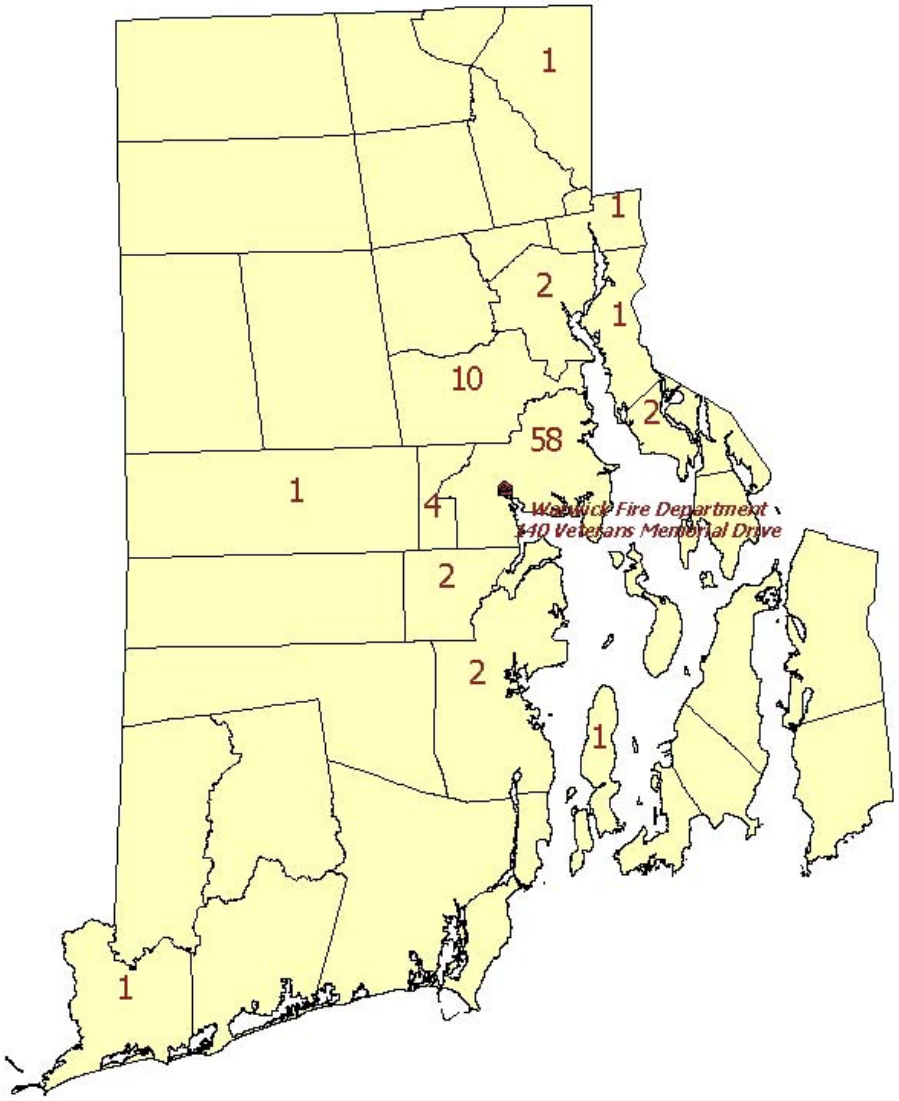
PARTICIPANT CITY/TOWN
MERCIRY THERMOMETER EXCHANGE
22 MAY 2004



OUT OF STATE/UNKNOWN = 2
TOTAL PARTICIPANTS = 44

FIGURE 2

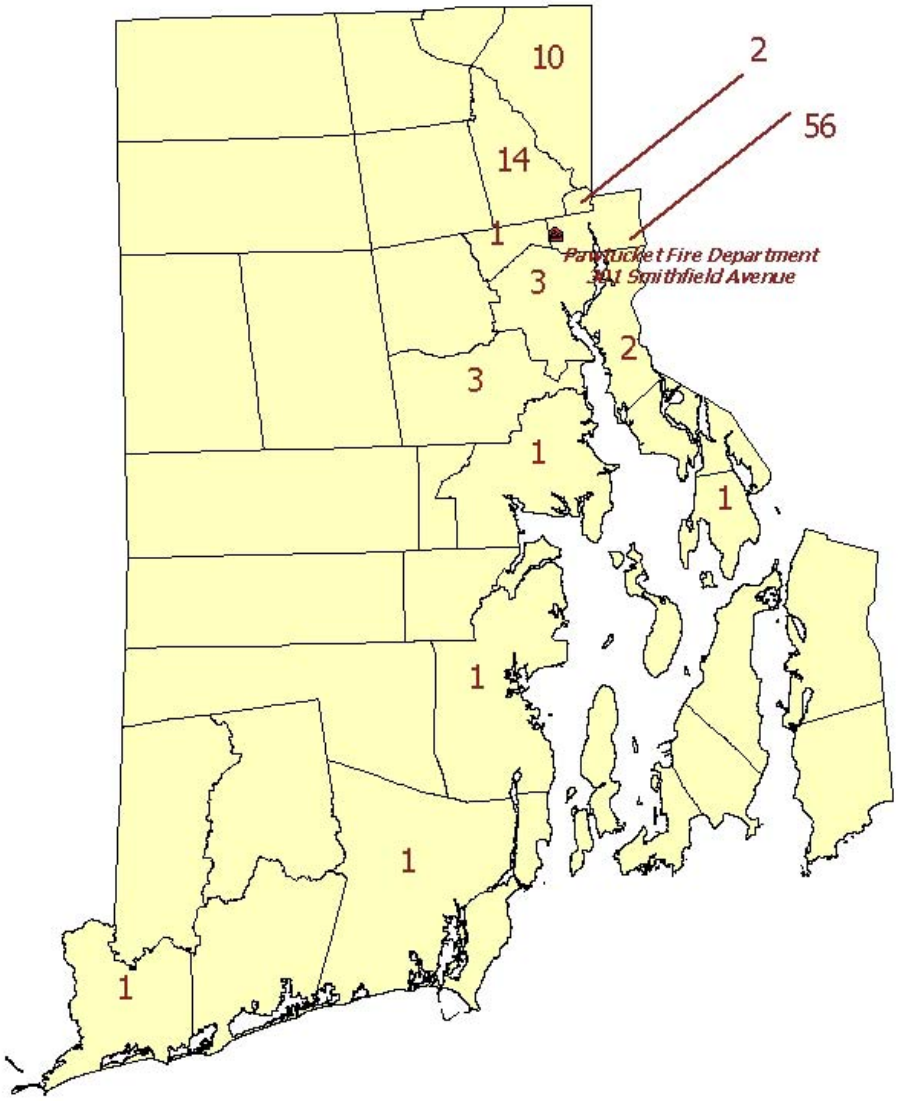
PARTICIPANT CITY/TOWN
MERCIRY THERMOMETER EXCHANGE
22 MAY & 5 JUNE 2004



OUT OF STATE/UNKNOWN = 0
TOTAL PARTICIPANTS = 85

FIGURE 3

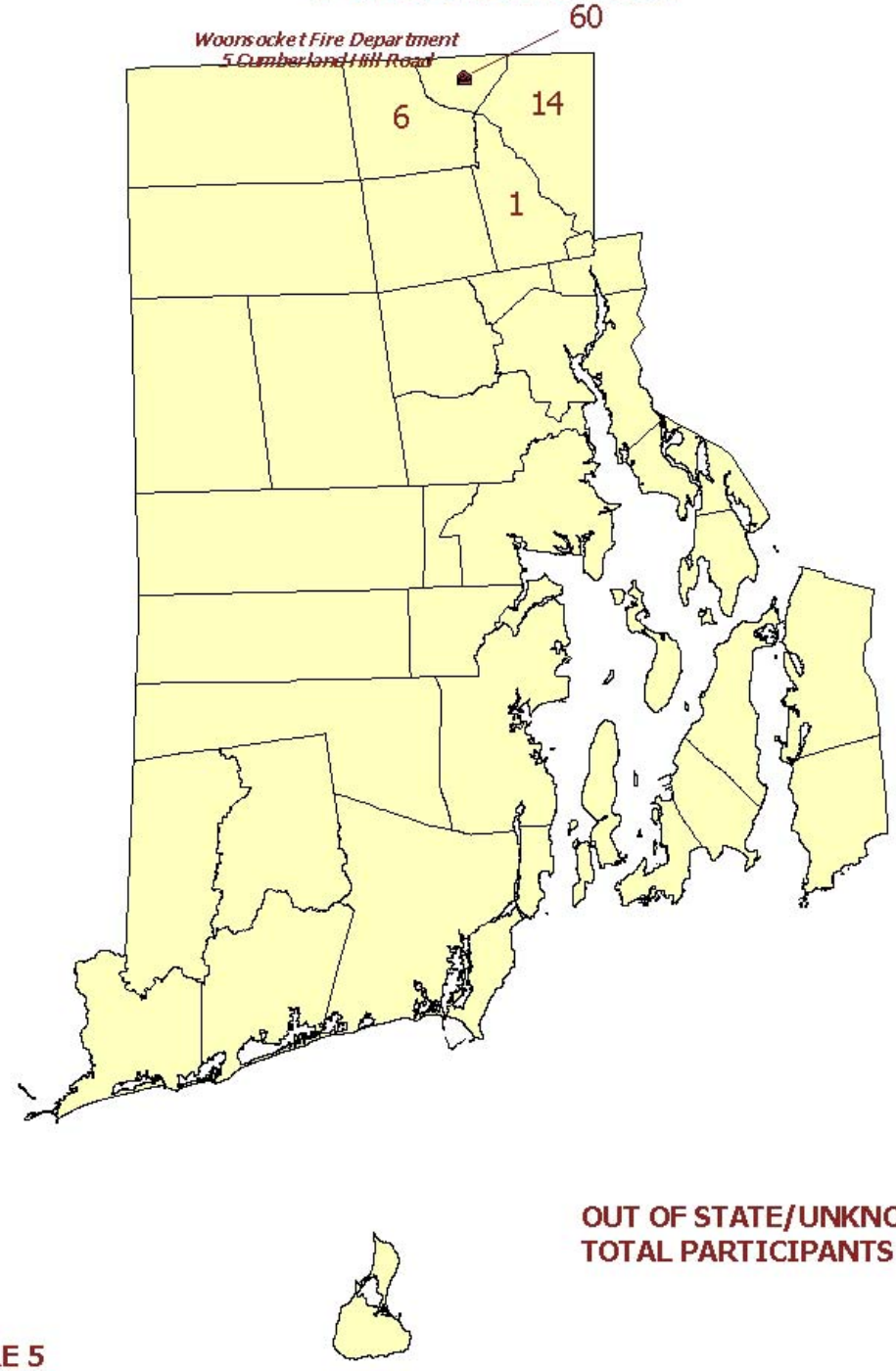
PARTICIPANT CITY/TOWN
MERCIRY THERMOMETER EXCHANGE
3 & 4 DECEMBER 2004



OUT OF STATE/UNKNOWN = 35
TOTAL PARTICIPANTS = 131

FIGURE 4

PARTICIPANT CITY/TOWN
MERCIRY THERMOMETER EXCHANGE
4 DECEMBER 2004



OUT OF STATE/UNKNOWN = 2
TOTAL PARTICIPANTS = 83

FIGURE 5

TABLE 1
PARTICIPANT CITY/TOWN OF RESIDENCE
2004 - ALL SITES

City/Town	Bristol	Hope Valley	Warwick	Pawtucket	Woonsocket	Total
Barrington	4	0	2	0	0	**6**
Bristol	26	0	0	1	0	**27**
Burrillville	0	0	0	0	0	**0**
Central Falls	0	0	0	2	0	**2**
Charlestown	0	2	0	0	0	**2**
Coventry	0	0	1	0	0	**1**
Cranston	0	1	10	3	0	**14**
Cumberland	0	0	1	10	14	**25**
East Greenwich	0	0	2	0	0	**2**
East Providence	6	0	1	2	0	**9**
Exeter	0	1	0	0	0	**1**
Foster	0	0	0	0	0	**0**
Glocester	0	0	0	0	0	**0**
Hopkington	0	12	0	0	0	**12**
Jamestown	0	0	1	0	0	**1**
Johnston	0	0	0	0	0	**0**
Lincoln	0	0	0	14	1	**15**
Little Compton	0	0	0	0	0	**0**
Middletown	0	0	0	0	0	**0**
Narragansett	0	2	0	0	0	**2**
Newport	0	0	0	0	0	**0**
New Shoreham	0	0	0	0	0	**0**
North Kingstown	0	2	2	1	0	**5**

TABLE 1
PARTICIPANT CITY/TOWN OF RESIDENCE
2004 - ALL SITES

City/Town	Bristol	Hope Valley	Warwick	Pawtucket	Woonsocket	Total
North Providence	0	0	0	1	0	**1**
North Smithfield	0	0	0	0	6	**6**
Pawtucket	1	0	1	56	0	**58**
Portsmouth	0	0	0	0	0	**0**
Providence	0	0	2	3	0	**5**
Richmond	0	11	0	0	0	**11**
Scituate	0	0	0	0	0	**0**
Smithfield	0	0	0	0	0	**0**
South Kingstown	0	6	0	1	0	**7**
Tiverton	1	0	0	0	0	**1**
Warren	2	0	0	0	0	**2**
Warwick	0	0	58	1	0	**59**
Westerly	0	5	0	1	0	**6**
West Greenwich	0	0	0	0	0	**0**
West Warwick	0	0	4	0	0	**4**
Woonsocket	0	0	0	0	60	**60**
Non RI/ Unknown	0	2	0	35	2	**39**
TOTALS:	**40**	**44**	**85**	**131**	**83**	**383**

TABLE 2
TOTAL ITEMS COLLECTED
2004 - ALL SITES

# Thermo-meters	Bristol	Hope Valley	Warwick	Pawtucket	Woonsocket	Total
1	24	23	34	54	36	**171**
2	3	8	19	34	24	**176**
3	5	5	10	15	10	**135**
4	4	3	3	9	4	**92**
5	0	2	3	1	2	**40**
6	0	2	2	0	0	**24**
7	2	0	4	1	1	**56**
8	0	0	3	1	0	**32**
9	0	1	0	0	0	**9**
10	1	0	1	1	0	**30**
12	0	0	0	0	1	**12**
13	1	0	0	0	0	**13**
17	1	0	1	0	0	**17**
20	0	0	0	1	0	**20**
29	0	0	0	1	0	**29**
Total:	**98**	**97**	**220**	**282**	**159**	**856**
Other Items:	**1**	**7**	**4**	**26**	**11**	**49***
Grand Total:	**99**	**104**	**224**	**308**	**170**	**905**

***Other items: 43 thermostats; 2 mercury switches; 2 jars containing liquid mercury; 1 blood pressure unit; 1 container with 12 pounds of liquid mercury.**

CONCLUSIONS

Primary prevention is an important public health function. For mercury, primary prevention means safely collecting mercury-containing products and removing them from circulation before contamination occurs. HEALTH's second annual series of community mercury thermometer exchanges proved to be a very successful primary prevention activity and removed 92 pounds of mercury from circulation.

HEALTH believes the success of this outreach effort is directly related to three factors:

- Willingness to participate in something that benefits their community;
- Coming to a local (i.e., within one town), familiar place like a fire station; and
- Receiving something for free.

Although HEALTH organized these thermometer exchanges, the degree of success achieved would not have been possible without the contributions of numerous community partners (c.f., **Appendix A**). The overall impact of this event can also be measured by the fact that all of our partner organizations expressed an interest in continuing to work together for future exchanges, while some additional community partners have come forward and volunteered to participate in future activities. HEALTH has also agreed to provide technical assistance to fire companies and other community groups who want to independently sponsor mercury thermometer exchange days in the future.

RECOMMENDATIONS FOR FUTURE ACTIVITIES

Continue to:

- Encourage fire companies to independently conduct future exchange programs.
- Solicit additional community partners to assist in this effort.
- Rotate drop-off locations according to community needs.
- Stagger hours that drop-off locations are open according to community needs.
- Allow more lead-time to advertise the thermometer exchange programs as well as explore different avenues to advertise besides press release (i.e. radio).
- Restrict distribution of incentives to the day of the exchange.

APPENDIX A

2nd Annual Mercury Thermometer Exchanges

Community Partners - 2004

Bristol Fire Department
Hope Valley Fire Department
Miriam Hospital
Pawtucket Fire Department
R.I. Dept of Environmental Management (DEM)
R.I. Department of Health (HEALTH)
Rhode Island Resource Recovery Corporation (RIRRC)
Warwick Fire Department
Woonsocket Fire Department

APPENDIX B

Photographs of Items Collected